

REMARKS

Applicant intends this response to be a complete to the Examiner's **13 January 2011** Non-Final Office Action.

DETAILED ACTION

The Examiner states and/or contends as follows:

1. Applicant's Amendments and Accompanying Remarks filed on May 09, 2011 has been entered and carefully considered. Claims 49 - 66, 96 and 98 - 118 are all the pending claims in this application. After careful consideration of applicant's amendment, the Examiner has withdrawn the rejections over Momose, and has maintained the rejection over Perez et al. as detailed in the Office Action dated January 13, 2011. The invention as currently claimed is not found to be patentable for reasons herein below.

Applicant acknowledges the Examiner's statements.

Claim Rejections - 35 USC § 102

3. **Claims 49-66, 96 and 98-118** stand rejected under 35 U.S.C. 102 (b) as being unpatentable over Perez et al. US Patent No 6,630,231 82

The Examiner states and/or contends as follows:

4. Considering claims 49 - 66, 96 and 98 - 118, Perez et al. teaches composite articles having a polymeric bulk or matrix phase and a polymeric reinforcement phase comprising polymeric microfibers. The microfibers can be provided by forming highly oriented, semi-crystalline, polymeric films or foams, followed by partially or totally microfibrillating the highly oriented film, thereby forming the microfibers [Col. 2, lines 13-18].

Furthermore, Perez et al. also teaches that Polymers useful in forming the microfibers include any melt-processable crystalline, semicrystalline or crystallizable polymers. Semicrystalline polymers consist of a mixture of amorphous regions and crystalline regions. The crystalline regions are more ordered and segments of the chains actually pack in crystalline lattices. Some polymers can be made semicrystalline by heat treatments, stretching or orienting, and by solvent inducement, and these processes can control the degree of true crystallinity. Semicrystalline polymers useful in the present invention include, but are not limited to, high and low density polyethylene, polypropylene, and thermotropic liquid crystal polymers [Col. 3, lines 10 - 20].

Moreover, Perez et al. also teaches that Useful polymers preferably are those that can undergo processing to impart a high orientation ratio in a manner that enhances their mechanical integrity, and are semi-crystalline in nature. Orienting semicrystalline polymers significantly improves the strength and elastic modulus in the orientation direction, and orientation of a semicrystalline polymer below its melting point results in an oriented crystalline phase with fewer chain folds and defects. The most effective temperature range for orienting semicrystalline polymers is between the alpha crystallization temperature of the polymer and its melting point. The alpha crystallization temperature, or alpha transition temperature, corresponds to a secondary transition of the polymer at which crystal sub-units can be moved within the larger crystal unit. Preferred polymers in this aspect therefore are those that exhibit an alpha transition temperature ($T_{sub \alpha}$) and include, for example: high density polyethylene, linear low density polyethylene, ethylene alpha-olefin copolymers, polypropylene. Particularly preferred polymers in this aspect have melting temperatures greater than 140 degree C and blends of such polymers with lower temperature melting polymers [Col. 3, lines 35-64].

Furthermore, Perez et al. also discloses that upon orientation, voids are imparted to the film. As the film is stretched, the two components separate due to the immiscibility of the two components and poor adhesion between the two phases. When the film comprise a continuous phase and a

discontinuous phase, the discontinuous phase serves to initiate voids which remain as substantially discrete, discontinuous voids in the matrix of the continuous phase [Col. 7, lines 43 - 50].

Moreover, Perez et al. also teaches that after orientation the cells are relatively planar in shape and have distinct boundaries. Cells are generally coplanar with the major surfaces of the foam. with major axes in the machine (X) and transverse (Y) directions (directions of orientation). The sizes of the cells are substantially uniform and dependent on concentration of blowing agent, extrusion conditions and degree of orientation [Col. 10, lines 53 - 68].

Perez et al. also teaches that the microfibers generally have an effective average diameter less than about 20 microns, and can have an effective average diameter ranging from about 0.01 microns to about 10 microns, preferably 0.1 to 5 microns, and are substantially rectangular in cross section. As the microfibers are usually substantially rectangular, the effective diameter may be a measure of the average value of the width and thickness of the fibers. Some microfibers have a Transverse Aspect Ratio of from 1.5:1 to 20:1, while other microfibers have a transverse aspect ratio of between about 3: 1 to 9: 1 [Col. 12, lines 10 - 20], thus anticipating all limitations in the instant claims.

As to the new limitation in independent claims 49, 56 and 60, for the fibrils of the polymer P1 to be in the polymer P2, this limitation also anticipated by Perez et al., because said reference teaches that the void-initiating component thermoplastic polymer and the semicrystalline polymer form a polymeric blend that is characterized for its limited solubility or immiscibility [Col. 6, lines 49 - 65]; which is interpreted by the Examiner as having the polymer P1 particles in the semicrystalline polymer P2.

Perez et al do not anticipate claims 49 - 66, 96 and 98 - 118 or newly added claims 119-124 as Perez et al do not make their films by extruding a molten blend of two polymers that form an alloys composition of microscopically crystalline or semi-crystalline fine fibrils of a polymer P1 surrounded by a polymer P2, where the polymer P1 and P2 are compatible or compatibilised to an extent that the film does not develop internal voids upon repeated flexing of the film.

Perez et al includes several methods for making microfibrils. Some of the method use a single polymer and fluid or sonication methods for removing or separating the fibers from the surrounding polymer. Other methods involve co-extruding blends of incompatible polymers so that the resulting films include voids in the film.

On the contrary, the present invention uses polymers that are either compatible or compatibilised to an extent that the film does not develop internal voids upon repeated flexing. Thus, the present invention does not produce microfibrinous films that include voids formed in the film during the manufacturing process.

Moreover, the fibrillated films of this invention comprise the reinforced material. They do not have to be surrounded by or embedded in a second polymer to form a reinforced article, as they are the reinforced article.

Because Perez et al. do not disclose reinforced films comprising microfibrils of a polymer P1 in a polymer P2 form during extrusion from a molten blend, where the P1 and P2 are compatible or compatibilised to an extent that the film does not develop internal voids upon repeated flexing film, Perez et al cannot anticipate claims 49 - 66, 96 and 98 -118. Moreover, Perez et al does not

even suggest to an ordinary artisan that such a film could be produced by simple extrusion. Applicant, therefore, respectfully requests withdrawal of this rejection and urges the Examiner to pass the case onto allowance.

Response to Arguments

The Examiner states and/or contends as follows:

5. Applicant's Amendments and Accompanying Remarks filed on May 09, 2011 has been entered and carefully considered. Claims 49 - 66, 96 and 98 - 118 are all the pending claims in this application. After careful consideration of applicant's amendment, the Examiner has withdrawn the rejections over Momose, and has maintained the rejection over Perez et al. as detailed in the Office Action dated January 13, 2011. The invention as currently claimed is not found to be patentable for reasons herein below.

6. Regarding Applicant's arguments against the rejections over Perez et al. with respect to claims 49 - 66, 96 and 98 - 118, these have been considered but are found to be not persuasive for the following reasons.

Applicant traverses the rejections in previous Office Action on the basis that Perez et al. is not directed to extruded materials formed with microfibrils of one polymer dispersed in another polymer, and because Perez et al discontinuous phase comprises microfibers not microfibrils.

In response to these arguments, the Examiner respectfully directs Applicant's attention to Perez et al.'s disclosure in [Col. 7, lines 32 - 35], wherein it is taught that the immiscible mixture of a first polymer component and a void-initiating component is extruded from the melt through a die in the form of a film or sheet and quenched to maximize the crystallinity of the semicrystalline phase by retarding or minimizing the rate of cooling.

With regards to arguments that Perez et al.'s discontinuous phase comprises microfibers and not microfibrils as claimed, the Examiner respectfully submits that the use of said different terms is just different terminology, because the particles claimed as microfibrils have dimensionally (Le. about 5 !-1m.) and in shape (tapes) characteristics that are equivalent to the particles disclosed in Perez et al. as the microfibers of the void initiating polymer component.

Applicant acknowledges the Examiner's statement and contentions and asserts that the current claims are patentably distinct over Perez et al as set forth above.

If it would be of assistance in resolving any issues in this application, the Examiner is kindly invited to contact applicant's attorney Robert W.Strozier at 713.977.7000

The Commissioner is authorized to charge or credit Deposit Account 501518 for any additional fees or overpayments.

Date: **1 November 2011**

Respectfully submitted,

/Robert W.Strozier/

Robert W.Strozier, Reg.No.34,024